The requirement of an unknown substance in fresh fish excreta by toxic stages of *Pfiesteria piscimorte* (nov.gen., nov.sp.) confounded experiments to test stimulation by absolute supplies and supply ratios of inorganic nutrients phosphate, nitrate and ammonium, since the excreta contains high nutrient concentrations as well as an unidentified stimulatory compound believed to be a form of organic carbon or nitrogen. In the absence of live finfish or their fresh excreta over a 4-day period, however, gamete production increased slightly at 25 μg/L nitrate (as NO_3^-N) or 25 μg/L phosphate (as $PO_4^{-3}P$), and increased significantly at $\geq$ 100 μg/L phosphate. These data indicate that phosphate can play an important role in maintenance of an inoculum of *P. piscimorte* (nov.gen., nov.sp.) in quiet waters as gametes that fuse to form planozygotes which, in turn, produce toxic vegetative cells when finfish enter the area. The gametes in the water column complement the dormant cyst "bank" that serves as an inoculum from the sediments. The laboratory data for gamete response to phosphate, considered along with the fact that nearly 2/3 of the field kills related to this toxic alga have occurred in phosphate-enriched waters of the Pamlico Estuary, provide compelling evidence that phosphate enrichment can act as a major factor in stimulating growth and toxic activity of *P. piscimorte* (nov.gen., nov.sp.).

The naturally occurring predators *Stylonichia* cf. *putricina*, a protozoan ciliate, and *Brachionus* sp., a rotifer, were found to be capable of significantly reducing test populations of *Pfiesteria piscimorte*'s (nov.gen., nov.sp.) toxic flagellated cells and cysts. While the rotifer may eventually offer hope as an agent of bio-control, the ciliate's consumption of flagellated dinospores apparently results in its excretion of a waste product that induces conversion of planozygotes to "giant" toxic amoebae which, in turn, attack and engulf the protozoan as predator becomes prey.

In summer 1991 we confirmed that the toxic flagellated cells (dinospores, planozygotes) and amoebae of *Pfiesteria piscimorte* (nov.gen., nov.sp.) are present in the Indian River, a tributary to the Delaware Bay. Following our guidance, in February 1993 Dr. A. Lewitus (Horn Point Environmental Laboratory, Maryland) confirmed the presence of *P. piscimorte* (nov.gen., nov.sp.) at a known fish kill site in Jenkins Creek, a tributary of the Choptank River in the Chesapeake Bay. Fish from South Carolina estuarine waters carried the dinoflagellate into aquaculture facilities in the Department of Zoology at North Carolina State University, where it subsequently bloomed and caused a major